Stanley

Northwest Territories

Renewable Resources

# Recycling of Beverage Containers in the Northwest Territories

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# SECTION 1.0
# INTRODUCTION

# 1.0 INTRODUCTION

## 1.1 GENERAL

Each year, over 10 million aluminum cans, 8 million beer bottles, 1 million glass bottles and 200 thousand plastic bottles enter the NWT. Very few of these ever leave.

The Northwest Territories cover one third of Canada's area. The environment is beautiful and unique, but also very fragile. The public in the Northwest Territories are becoming aware of the necessity to stop the uncontrolled disposal of such large numbers of containers.

The Department of Renewable Resources of the Government of the Northwest Territories has entrusted Stanley Associates Engineering Ltd. with the execution of a study into the "Recycling of Beverage Containers."

## 1.2 PURPOSE

The purpose of this study is to research existing recycling systems, gather all pertinent data on the beverage and transportation industries, and evaluate the potential of recycling beverage bottles and cans in the Northwest Territories.

## 1.3 APPROACH

In order to achieve the purpose of the study, the work was broken down into five sections.

In the first phase, the history and existing concepts of recycling are researched. After a general description of recycling methods, the approaches taken by various provinces are outlined.

# SECTION 2.0

# REVIEW OF BEVERAGE CONTAINER RECYCLING PROGRAMS IN OTHER JURISDICTIONS

## 2.0 REVIEW OF BEVERAGE CONTAINER RECYCLING PROGRAMS IN OTHER JURISDICTIONS

### 2.1 GENERAL BACKGROUND

Beverage container return systems have been in existence since the early 1970's on a formalized basis. The first province to enter beverage container legislation was British Columbia, which incorporated sections under its Litter Act. Virtually all beverage container legislation (with the notable exception of Ontario) has litter and litter control as their prime objective.

Beverage container return systems in Canada have existed for a very significant period of time. The beer industry and the soft drink industry invented return system with the advent of refillable/returnable bottles. For soft drinks, refillable/returnable bottles were the norm until the mid-1960's to the mid-1970's. The advent of non-refillable/non-returnable soft drink container, in many cases, helped the development of beverage return legislation.

The beer industry only started converting to canned beer in the mid- to late-1970's. The Canadian beer industry had, until very recently, one of the most efficient, effective return systems with the universal bottle. The beer industry developed its container/distribution/collection system in response to provincial legislation. The liquor control agency in each province have typically refused to sell a domestic beer not produced within the province. Thus, refillable containers made sense. When forced with controlled marketing, the approach of greatest internal efficiency became important. From these factors emerged the universal bottle, with its useability by all manufacturers, and its high trippage levels.

In general, there are two kinds of beverage container return systems; deposit and non-deposit systems. These two systems will be explained in more detail.

### 2.1.1 The Deposit System

Deposit systems are far and away the most common system in Canada. Just as return systems originated with the soft drink and beer industry, so did deposits.

Deposits have been the typical method used to stimulate returns. Deposits are, in reality, artificial values which have been placed upon the container. In a deposit system, these are the values which the consumer pays to begin with and which are refunded to him when the container is returned.

When a deposit is set on a refillable bottle, the level of deposit typically represents the replacement cost of that container. If a container is not returned, then the manufacturer has the capital necessary to replace it.

Deposit systems for non-refillable are quite different from those for refillables. Manufacturers of beverages utilize non-refillable containers because it is difficult, or uneconomic, to collect containers. In refillable systems, the manufacturer includes a portion of the container cost into the price of the beverage. This cost is normally calculated utilizing replacement costs, trippage rates plus collection and processing costs. With non-refillable containers, however, the beverage manufacturer has assumed that the container will not be returned. As such, the manufacturer includes the full container price in the price of the beverage. In this case, the manufacturer has no financial stake in having the container returned. Since a container has no further value to the manufacturer, and its material value is relatively low, deposits on non-refillable containers are truly artificial.

Whereas in refillable containers, non-returns are used to purchase additional containers (i.e., to replace the container which was lost), non-refillables, if they are not returned, merely created a pool of unclaimed desposits. The question of who do the unclaimed deposits belong to has plagued non-refillable deposit systems since their inception.

Since all provinces maintain a deposit system for refillable beverage containers, most discussion on beverage containers tends to focus on non-refillable containers.

## ADVANTAGES OF DEPOSIT SYSTEMS

The biggest advantage that deposit systems have is that they work. Even critics of deposit systems are forced to admit that they do foster extremely high levels of returns and do generate large quantities of material.

Return rates in Alberta, for instance, for refillable containers tend to vary between 90% and 97%; in Saskatchewan, between 75% and 90%; in British Columbia, between 85% ands 90%. No known non-deposit system can generate such high return levels.

Return levels on non-refillable containers are, in general, lower than those of refillable containers. With the exception of the plastic soft drink bottles (PET - polyethylene terephthalate), non-refillables tend to be concentrated in the single serving sizes. Family-size containers tend to be used in a method that they can be saved and returned. Single-serving containers tend to be consumed outside the home, making storage prior to returning more difficult. In addition, in areas where refillable and non-refillable containers compete, refillable containers tend to carry higher deposits.

Although there is no direct correlation between deposit levels and return rates, it is known that very high deposit levels do lead to higher return levels. Higher return levels cannot, by themselves, be attained by high deposit levels (unless the deposits are set extraordinarily high). The right combination of the use factors and deposit levels can lead to high levels of return. A good example of this is two- and three-litre plastic containers in Alberta which are returned at a 92% to 95% rate with a $0.30 deposit. Ontario is attempting to recover these containers without a deposit with minimal success. The way the containers are used is identical in both provinces. It is more convenient for Ontario consumers in the project area to return these containers than it is for equivalent consumers in

Alberta. However, the return rate in Ontario has been minimal, while the return rate at the onset in Alberta was extremely high. Another distinct advantage that deposit systems have is that they are already known to the public. To many, the extension of deposits to non-refillable containers is a very natural extension of the system already in place in the beer and soft drink industry.

## DISADVANTAGES OF DEPOSIT SYSTEMS

Deposit systems are generally more expensive than other alternatives. Because deposit levels on non-refillable containers are artificial, monitoring systems must be built in to ensure that only containers on which deposits have been paid are the ones which have been returned. Furthermore, collection points are often private rather than public organizations and must be profitable. When a deposit is paid it must be returned in full. This leaves no margin for profit by the collector. In most provinces where returns are to retailers, the costs are borne by the retailer as part of the cost of doing business, but these costs can be very high. Retailers in most provinces are lobbying for handling fees if they are not already paid them. Alberta, which operates a system of collection depots, sets high handling charges which are paid by the manufacturer to the depot operator. For instance, on liquor and wine containers, a depot operator is paid an additional 4.5¢ per container for handling.

Deposit systems also inflate the price of the product at the point of purchase. The shelf price of the beverage will rise by the level of the deposit and the level of the handling charge.

Since the deposit starts with the manufacturer (with the notable exceptions of some U.S. states, where the deposit starts with the retailer, and British Columbia, where the deposit on cans starts with the retailer), the manufacturer must ultimately be the one who takes back the container and pays out the deposit. As such, there will be additional handling built in for the manufacturer. This money obviously will be reflected in the price of the beverage. Although the point can be made that the majority of the money paid out by the consumer will be returned, it must be understood the container and returning the container are really two separate issues.

In general, there are three separate decisions to be made by the consumer. First, there is the decision to purchase. While many things affect the decision to purchase, the total amount of money to be expended (i.e., the shelf price) is an important part. This is especially true if there are competing products with different price levels. This decision is largely unaffected by the fact that some of the money paid may be returned.

The next decision comes after consumption. That decision is one to save or discard a container. This decision can be affected by deposit and the convenience or inconvenience of storing the product.

The last step is the decision to return a container. If it has already been decided to purchase a product that carries a deposit and to save the container, then the decision to return the container will generally follow. This final step is supported by the fact that a deposit exists.

As can be seen, the additional costs on a container from deposit and handling charges, particularly if there are other containers to which the same costs do not apply, can affect the sales of that particular beverage.

### 2.1.2 Non-Deposit Systems

Non-deposit systems have been generated a fair amount of interest in the last number of years. One of the chief reasons for this interest is the primary drawback of deposit systems -- their cost.

A non-deposit system does not operate with an artificial deposit value, but instead utilizes the inherent value of the container material. There are two basic kinds of non-deposit systems:

- buy-back system
- drop-off system

## BUY-BACK SYSTEMS

Buy-back systems are very common in the United States, particularly for aluminum. In the buy-back system, the consumers return their containers to a central point where they are paid for the value of the commodity returned; usually a price per pound.

The buy-back centre sorts and processes the material (in many cases, bales it) and sells it to a broker or directly to a market. The price paid to the consumer allows for the buy-back centre to make a profit.

Buy-back systems work best for materials with high values, such as aluminum, or for materials with moderate values where minimal distances to market are a factor. In either case, the margins must be sufficient to enable buy-back systems to exist.

Manitoba has the best example of a buy-back system as a return mechanism. The Manitoba Soft Drink Association has sponsored the development of return trailers. These trailers buy back aluminum cans from the public. They appear on a scheduled basis at a number of Winnipeg shopping centres. The program has been in operation since September 1986. There currently is one trailer in existence which services Winnipeg. Another is being developed which will service rural Manitoba.

## DROP-OFF SYSTEMS

Drop-off systems are a very simple idea. In a drop-off systems, bins or containers are placed in a community where the public can "drop off" their material. When the bins are full, they are emptied or picked up and returned to a central facility. Here, the materials are sorted and processed prior to being sold. Drop-off systems are inexpensive to set up and inexpensive to operate. They also generate very low grades of material. This is because no verification of the material is being done as it is being dropped off. Often these systems are operated by volunteer groups.

Drop-off systems typically are used for materials of low value. Newspaper is one of the most common commodities collected this way.

Ontario has developed a non-deposit system that is a combination of a drop-off system and a buy-back system. Under Ontario's approach, non-refillable beverage containers can be sold without a deposit, as long as the soft drink manufacturer enters into an agreement with the province to attain a certain return rate. The onus is then upon the manufacturer to attain and maintain a return rate within an agreed-upon timeframe. Much of the emphasis on returns is on curbside collection programs. In this process, consumers are requested to keep the materials separate from the normal waste stream. On an appointed day, the consumer deposits the material at curbside in a similar fashion to garbage. A special truck then collects the material. This is a form of buy-back except that in the place of money, a service is offered.

The concept behind the Ontario approach is that the high value of many beverage containers, particularly aluminum, will help drive curbside collection programs to collect a variety of other materials.

Non-deposit systems are currently very new to Canada. Buy-back systems have been used in the United States for some time, with very low return rates. Ontario represents a different approach to that of any other system yet attempted. However, even Ontario reserves the right to other options if methods being tried do not work. (Ontario's present system is described in Section 2.4.5.)

## ADVANTAGES OF NON-DEPOSIT SYSTEMS

A distinct advantage of the non-deposit system is that there is no interference in the marketplace. This is because they operate with the true value of the container material, rather than with an artificial value imposed by legislation. As such, non-deposit systems tend to be non-inflationary.

For this same reason, these systems tend to be non-discriminatory. The glass in a soft drink bottle is worth the same as that in the liquor and wine bottle, which is worth as much as the glass in a pickle jar or peanut butter jar. The same basic rules apply to all containers. Non-deposit systems can be substantially less expensive to operate than deposit systems. None of the monitoring systems, to ensure that only "legal" containers are returned, are necessary. Basically, all containers have the same value. As such, more realistic materials handling, processing and shipping options are possible. This, again, is because each container does not have to be verified.

Non-deposit systems are also more compatible with other recycling systems than are deposit systems. This is because of the discriminatory aspects of deposit systems. Since the materials have not been singled out for special treatment, they can fit more into systems that have been established for other materials. Deposit systems, by contrast, often have their own collection systems.

## DISADVANTAGES OF NON-DEPOSIT SYSTEMS

Non-deposit systems, for all their advantages, have yet to have the same proven history as deposit systems. Their history has been spotty and the return rate associated with such systems has been very low.

Non-deposit systems are at their best when working with high value materials (such as aluminum) in highly-populated areas. Under these circumstances, the value of the commodity being collected can best justify an operation to collect it. Equipment to process materials can be expensive, and low volumes of materials out of small centres can be passed off as being uneconomic to collect.

The secondary materials market is very volatile. The swings in market are less drastic than they used to be, since secondary materials are becoming more accepted as genuine resources. The market, however, is still subject to substantial swings.

Non-deposit systems are also discriminatory against refillable bottles. As indicated earlier, refillable bottles, irregardless of whether there is mandatory legislation or not, still carry deposits. It is this deposit which provides the manufacturer with the capital to replace the container. If, however, non-refillable containers are sold without deposits, then a shelf price comparison of a refillable versus a non-refillable container would, in all likelihood show the refillable priced higher or, in the best case scenario, at an equivalent price. This tends to work against sales of refillables or introduction of refillables.

## 2.2 COLLECTION STRATEGIES

The type of collection system chosen can have a significant effect on the return levels of the containers. The proper return system can compliment the deposit level, or material value, and facilitate and encourage returns. The proper system will aid returns, while keeping deposits and materials value low. A number of collection strategies are explained in this section.

### 2.2.1 Return to Retailer

This is the most common kind of return system in Canada and the U.S. today. In this collection strategy, a retailer who sells a beverage, must take back the container. The containers are then collected from the retailer by the manufacturer. A handling charge may or may not be paid to the retailer for handling the container.

The best Canadian example of return-to-retailer collection strategy is British Columbia. In British Columbia, retailers must take back all containers of the kind and type that they sell. B.C.'s legislation applies to soft drinks and to beer.

Return-to-retailer have their history rooted in the soft drink industry. The soft drink industry historically used the retailers as the return mechanism for refillable containers. They thus, did not have to set up a separate collection mechanism.

This system is relatively efficient. The consumer purchases beverages from the retailer, and can return the empties there. The manufacturer delivers the product to the retailers, and takes the empties back in one trip.

Return-to-retailer programs can be used with either deposit or non-deposit systems, although they are more often associated with deposit systems.

## ADVANTAGES OF RETURN-TO-RETAILER SYSTEMS

Return-to-retailer systems have many distinct advantages.

There is first of all the historical advantage. Consumers are accustomed to returning their soft drink containers to retailers. As with deposit systems, extension to additional containers types or additional retailers seems logical. Many Canadian provinces also allow consumers to return empty beer containers to liquor stores, or beer stores. These types of systems have been well accepted.

Secondly, there is the advantage of numbers. In return-to-retailer programs, there are as many return points as there are sales points. The consumer is not forced to search for a collection point to return his containers, or have to maintain knowledge as to where one is. He simply returns it to the place where to beverage was purchased, often at the same time when additional beverages are purchased.

Return-to-retailers programs typically impose daily limits upon the number of containers that can be returned by any one consumer. This is done to protect the retailer from having to accept truck loads of containers at a time. This forces the consumer to return small quantities of containers at a time, and often results in the return of the containers when the consumer purchases others. When these containers are refillable containers, this is a distinct advantage to the manufacturer, since the turnaround time on containers is shorter. This makes the manufacturer's operation more efficient.

## DISADVANTAGES OF RETURN-TO-RETAILER SYSTEM

Retailers are in the business to sell material to the public. Forcing them to accept material back from the public and pay out cash or credit purchases, runs contrary to their business. Retailers, when legislated into accepting containers back, have met the legislation with significant opposition. Retailers in Quebec when forced with return-to-retailer collection systems, started "delisting" soft drinks. Retailers in southern British Columbia are currently taking a similar kind of action with the soft drink companies.

Return-to-retailer programs are very expensive to retailers. A study currently completed by the Retail Council of Canada found that the cost to retailers in British Columbia was 9¢ to 21¢ per container, depending upon the retailer.

Under these circumstances, retailers often do not make it convenient for consumers to return containers as there is no financial advantage in having containers returned. As such, although convenient in terms of locations, and number of outlets, returning containers to retailers can, and often does, prove to be a frustrating experience for consumers. This is not particularily conducive to developing and maintaining dealer cooperation and high return levels.

As indicated earlier, return-to-retailer systems with limits do tend to dissuade the consumer from stock piling material. This can be a distinct advantage to the manufacturer, on refillable containers. However, it is not always convenient to return containers when purchasing beverages. As such, stock piles in the home often occur. When these occur, consumers can either return containers at the maximum level over an extended period of time, give the containers away to something like a bottle drive, or sort the containers and return them directly to the manufacturer. None of these options are particularly conducive to maintenance of high return levels.

Typically, staff members of a retailer are part of the overhead of the retailer and any task performed by the staff are also part of the overhead. The same can be said for space -- it is part of the overhead of a retailer even when used for

storing empty beverage containers. Container returns, therefore become part of a retailer's overhead, and their cost and revenue is not attributed directly to the containers themselves, but typically to all commodities sold there. Thus, even purchases of eggs, milk, or peanut butter, are paying part of the cost of beverage container return systems.

Alberta uses a return-to-retailer option for refillable soft drink containers. It also offers the consumer an option to return larger volumes to depots, which accept all container types. Retailers must only take back refillable containers of the type sold. Although this would seem to solve the problem, it creates a new one. Because retailers are not interested in having containers returned to them, and because they must only accept returns on refillable containers it is not in the retailer's best interest to sell refillable containers. This obviously restricts the markets for refillable containers.

### 2.2.2 Depot Systems

Depot systems represent another distinct collection strategy. In a depot system, entities are established whose sole function is to collect and sort emply containers. The manufacturer then collects his containers from the depot.

Alberta has the only multi-container depot system in Canada, and the most comprehensive system in North America.

Depots are typically thought of as being government controlled; however, this must not, by necessity, be true. Brewers agents in many provinces have used depots for many years, and their depots are all privately owned and privately controlled.

Since depots themselves are merely transfer operations, they still require that the manufacturers collect their containers.

A variation is a system under development in California which will use recycling centres for depots. The recycling centre collects the material, pays the deposit,

and then markets the material to either end users or brokers (an essential part of the system is very low deposit levels). The State of California makes up the money to the recycling centres for any short falls between collection costs and selling costs from a large fund of money they receive by imposing a surcharge on beverage sales.

Depots can also be utilized in non-deposit systems. Typically, they are then called drop-off centres and the public "drops off" their containers at these centres. Normally, the only materials these would apply to would be extremely low value materials, otherwise a buy-back centre would have been developed. Since drop-off systems are generally unmanned, the participation rates are usually low and the material often of poor quality, primarily because of contamination problems. Drop-off systems are generally considered to be ineffective.

## ADVANTAGES OF DEPOT SYSTEMS

The chief advantage the depots have over return-to-retailer systems, is that the depots encourage people to return containers. Whereas a retailer has no interest in having the containers returned, a depot's only source of income is the revenue generated from container returns. As such, it is in the depot's best interest to foster high levels of returns.

Since a depot is a seperate entity whose sole function is container returns, a handling charge of some form must be built into the product. The depot cannot assume it is overhead and pass it on to other products. Depot systems pass the cost of disposal back to the consumers of the product via the handling charge imposed by the manufacturer.

Depots also foster bulk container returns. If the containers are stock piled for any period of time, there is no reason for them not to be returned all at one time. In addition, since depots deal with all container types, they facilitate returns of all types of containers both of high and low deposits. Because of bulk returns, it becomes easier for non-profit organizations to run bottle drives, and use them as money-making ventures.

Depots also create a number of small businesses leading to increased economic activity. The work done by depots requires a low skill level or young people. This means that depots provide employment for persons of low job skills. In Alberta, there are a number of depots that are run by handicapped organizations. These depots not only supply employment to the handicapped, but the revenue generated by them can also cut down on the amount of public funding necessary to help run the handicapped centre.

In a depot system it is the responsibility of the manufacturers to pick up their beverage containers from the depots. Refillables are generally sorted in the depot and picked up by the manufacturer when truckload quantities are accumulated. Manufacturers have little interest in handling and disposing of their non-refillables and it makes little sense to sort them by manufacturers in the depot. A situation could develop, as in Alberta, where the manufacturers collectively hire an agent to collect and dispose of all their non-refillable containers. This frees the manufacturers of this task and puts larger quantities of recyclable materials into the hand of one (or more) agent(s), who can sell these materials, on behalf of the manufacturers, for optimimum prices to the recycling industry.

## DISADVANTAGES OF DEPOTS

Depots do interfere with the distribution system for the beverage industry. Whereas with return-to-retailer systems, distribution vehicles can return to the plant with some pay-load, under a depot system, particularily in large urban areas, depots generally have to be serviced by a special truck. This is because there are fewer depots than retailers, each depot with a greater volume. This truck must go to the depots empty, and return full whereas the distribution truck goes full to the retailers, and back to the plant primarily empty. From this point of view, the system is less efficient.

Because depots make all of their profit from empty containers, there must, by necessity, be many fewer depots then retailers. This means that the consumer must determine where the container could be returned. The question of volumes to a depot is a difficult one. If 75% of all containers are returned, then 75% of

all consumers who visit retailers, and purchase beverages, will return their containers to depots. Alberta has somewhere between 12 and 15 thousand retailers of soft drinks and about 200 depots. Even though the depot can handle containers more efficiently, congestion can, and often does occur. However, the more depots in place, the lower volume per depot, alternately, the higher the handling charge must be. The balance between numbers of depots, volumes of containers to depots, and handling charges must be maintained in an appropriate balance, for proper operation of the system.

The handling fee question, is one which has haunted depot systems since their onset. The history of Alberta's depot systems has been an never ending upwards spiral of handling fees.

Many of the problems associated with depot systems centre around the central administration. Alleviation of these administration problems, are complicated by the large number of different groups involved, the number of varying container types, a significant variation in depot sizes, etc.

### 2.2.3 Buy-Back Systems

Buy-back systems were previously explained in the discussion on deposit or non-deposit systems. Buy-back systems do represent a collection option. In essence, they operate like a depot, except that buy-back centres typically undertake marketing of the commodity themselves, and do not rely upon the manufacturer of the beverage to provide the marketing for them. Their revenue is generated from the sales of the commodity.

## 2.3 OTHER LEGISLATIVE OPTIONS

There are other options available to governments considering beverage container legislation. Some of these options have been taken to help facilitate return systems. Others have entirely different motivations. A number of these options will be explained in this section.

### 2.3.1 Container Restrictions

Most restrictive container legislation is put in place to protect the refillable container. Refillable containers are considered by many to represent the most rational container type. An average container can be expected to reach anywhere from 10 to 20 trips during its lifetime (in practice, bottles are often culled after 8 to 10 trips primarily for aesthetic purposes). The only type of material known that can be used in refillable containers is glass, which is easily recyclable. When the container is removed from use, it can be remade into another container.

The soft drink companies; however, have been moving away from refillable containers. There are a number of reasons for this including increasing costs of collections, decreasing costs of alternative containers, and problems such as exploding refillable containers. All of these are making non-refillables more attractive.

The soft drink industry is changing in structure. While the soft drink industry used to consist of small bottlers, covering a relatively small area, today's bottling plants and canning plants are large operations, often covering a large geographic distance in distribution.

Despite their advantages, refillable containers (because they must be durable) are very heavy and bulky. This makes distribution over any significant distances very difficult. A soft drink distributor for instance, can carry almost three times the number of cans on a truck than he can equivalent refillable bottles. In addition, refillable containers must also be cleansed and inspected for foreign contents prior to reuse. All of these factors point out that the refillable bottle for todays soft drink manufacturer is less cost-efficient to handle than a non-refillable one.

Some studies have shown that the energy balance on an aluminum can, which is used once and recycled, to be superior to refillable containers of the same size.

Refillable containers for smaller manufacturers, still continue to be the cheapest container option because of the high initial investment costs for non-refillable canning facilities.

Since refillable containers can only be economically distributed over small distances, container restrictions can aid in establishing and maintaining a localized beverage industry. Such an industry would be protected from competition outside their territory by the economics of transportation of refillables. Competition internally could occur, but it is difficult to envisage someone shipping a product in and distributing it in refillable containers, and being able to compete against a locally produced product.

Saskatchewan is the best known example of restrictive container legislation. In Saskatchewan, it is illegal to sell soft drinks and beer in non-refillable containers. The only exemption is made for the northwestern section of the province, where population density is very low. Containers are returned to retailers. It is interesting to note that the Saskatchewan industry is small and localized. No canning facilities existed prior to the legislation or exist today in Saskatchewan for soft drinks or beer.

## ADVANTAGES OF CONTAINER RESTRICTIONS

Mandatory use of refillable bottles necessitates a collection system. Since manufacturers want their containers returned, they will establish their own collection system. Little or no government involvement will be required.

Restrictive legislation can be used to help protect a soft drink or beer industry from outside competition and make small companies more competitive. Therefore, restrictions on containers can help establish a soft drink and beer industry.

Refillable systems are also more labour intensive than non-refillable systems. Canning lines operate at high speeds with few personnel. Bottling lines are much slower, and require more personnel. In addition, there are sorting and cleaning

operations which must be performed. In times of high unemployment, this can be an advantage.

While this sounds like the more expensive system, bottling equipment is less expensive than canning lines. In addition, canning lines can only be justified when there is a large market to serve, primarily because of the higher speeds they operate at. Bottling equipment; however, is more flexible, and can serve a smaller market.

## DISADVANTAGES OF RESTRICTIVE CONTAINER LEGISLATION

The packaging industry is changing quickly. New concepts and new packaging are emerging on a continuous basis. Restrictive legislation is basically a static situation. It does not allow for changes in packaging which may provide substantial advantages in other areas.

A good example is the 1.5 L soft drink container. This was the container that was banned in the early 1980's because of its capability of exploding. In many places in Canada, the container which replaced it was the 2.0 L plastic container (PET). This has not been possible in either Saskatchewan or Ontario (which until recently had a form of restrictive legislation). This meant that the largest container available was the 1.0 L refillable container. Larger containers, of course, have the advantage of more product delivery in the same package. As this example shows, it is not always possible in a restrictive situation. Current technology limits the largest refillable package available to the 1.0 L glass bottle.

The total economics of operating a business must be researched, including all handling and transportation costs. It must be ensured that, in the long run, an uneconomic solution is not fostered and legislated. As much as restrictive legislation protects an industry, it also limits competition. This can be a dissadvantage, and lead to higher prices.

Non-refillable containers do have their place, particularily when they are going to be used in situations which will make their return difficult (camping, hunting, surveying, construction, camps, etc.). If restrictions are placed on the sale of non-refillables, then the effect will be to turn refillables into non-refillables which in itself is a non-productive move.

### 2.3.2 Sales Restrictions

Sales restrictions are based upon similar premises to those of container restrictions, but approach them from a substantially different angle. Sales restrictions recognize that there is a value in selling non-refillable containers and allow them to be sold. However, they may only be sold at a certain percentage, or in a specified location, or to prescribed clientelle, or in some other method. The object is to reduce or control the sale of non-refillables, not to eliminate them.

Sales restrictions can be either mandatory or voluntary. In a voluntary system, the bottler or brewers agree with the government to limit non-refillable sales to a certain percentage. Manitoba operates under such a system. The province of Manitoba and the soft drink companies there have agreed to limit the sales of non-refillables.

Mandatory sales restrictions involve legislation and would involve imposition of limits on the beverage industry or portions thereof.

Restrictions would be placed directly upon the manufacturers in terms of percentage of sales. This could be implemented either as a percentage of containers sold, or as a percentage of gallons sold.

Ontario introduced a modification of this idea some time ago. Under the Ontario idea, which was termed mandatory availability, restrictions were placed upon retailers. Under the Ontario approach, if a retailer sold non-refillables, then he had to sell an equivalent refillable bottle. While an innovative approach, it is proved largely unworkable because of enforcement problems. Often, there was no equivalent container in refillable and non-refillable. In addition, there arose

the problem of double shelf space. The program was eventually left as unworkable. One approach so far unused would be to limit the sales of non-refillables to a certain area or districts. Saskatchewan has done this in a limited way with their non-refillables, with reasonable success. Since sales restrictions are really closely related to container restrictions, the advantages/disadvantages are quite similar and will not be repeated here.

### 2.3.3 Litter Taxation

Litter taxation does not really represent an approach to beverage container legislation, but to litter control. Litter legislation imposes a tax upon articles which have a high prepensity for being littered. This money is then ear-marked for litter control programs or in some cases, recycling programs.

## 2.4 EXISTING BEVERAGE LEGISLATION

### 2.4.1 British Columbia

British Columbia's system is legislated under the B.C. Litter Act. This Act is administerd by the B.C. Ministry of the Environment.

British Columbia was the first province in Canada to pass beverage legislation. The British Columbia system relies on deposits as the prime motivator to encourage return of containers. B.C. relies upon the retailer as a prime return mechanism. No handling charges are paid to retailers, however, retailers in B.C. are actively lobbying for handling charges on containers. A new study done by the Retail Council of Canada indicates that handling charges for refillable containers in B.C. at the retail level is 9¢ to 21¢, depending upon the retailer. The same applies to 2 L and 750 ml non-refillables. In British Columbia, deposits on cans start with the retailers. Since only 50% of cans come back, the retailer receives his handling charge from the deposits of cans not returned.

Beer container returns are handled by the Pacific Brewer's Agents (PBA). Beer bottles and cans are returnable to liquor stores in B.C. to a maximum of 48 per person per day. No return mechanism is in place for liquor or wine containers. Only soft drink and beer containers are included under the British Columbia Act. The Act does not go as far as to include juices or bottled waters, etc.

### 2.4.2 Alberta

Alberta's system is legislated under the Beverage Container Act. The Act is administered by the Alberta Department of Environment. Alberta also uses a deposit system.

Alberta stands unique in Canada and, until very recently, in North America in its approach to beverage legislation. Recently, some U.S. states (notably, New York and California) adopted somewhat similar approaches to that used in Alberta.

Alberta offers three return mechanisms for beverage containers.

1. First, similar to British Columbia, beverage containers may be returned to retailers. However, in contrast to B.C., where retailers must accept all container types, retailers in Alberta must accept only refillable containers of the kind and type they sell (Beverage Container Regulations, Section 4 - - RSA 1980).

2. As a second return mechanism, the Province has established a network of private depots which accept all beverage containers from the public. These depots' sole purpose is container collection. These depots are licenced by the government. They receive their funding through a handling charge per container. This handling charge is paid to them by the bottler or distributor of the beverage.

3. The third system in place is the Alberta Brewer's Agents system of deposits for domestic beer bottles and cans. Domestic beer containers are exempt from Alberta's Beverage Container Act. The prime reason for this has

been this system of deposits which has consistently generated high return levels on beer containers.

Although in many places of the province the Alberta Brewer's Agents Depots and the Provincial Beverage Container Depots are the same operation, they are, in effect, two distinct systems.

The Beverage Container Act has been in place since 1971. The original purpose of the Act was litter control, and it remains the same today, although the system does have strong recycling overtones. Included as beverages are liquor and wines, soft drinks, fruit and vegetable juices (in convenience cans) and imported beer.

Manufacturers of soft drinks must not only refund deposits and pay handling charges to depots and retailers, but they must also collect containers from them.

An interesting sideline has developed in the Alberta system in the non-refillable container area. When the depot system was first introduced, the primary non-fillable was the soft drink can. Rather than each manufacturer having to collect his own cans, the manufacturers appointed a common agent and devised a system whereby sorting of the containers to manufacturers was not necessary. The same basic structure applies to all non-refillable soft drink containers today.

The Alberta Liquor Control Board (designated as manufacturer of liquor and wine in the province) appointed the same agent. This has introduced a level of efficiency into collection depots.

### 2.3.3 Saskatchewan

Saskatchewan's system is legislated under the Saskatchewan Litter Act. The Act is administered by the Saskatchewan Department of Environment. Saskatchewan also utilizes a deposit system. Saskatchewan has a similar situation to British Columbia, where all beverage containers flow back through retailers. No handling charge is paid to the retailers for handling the containers. Beer is

subject to this regulation and beer bottles are returnable to liquor stores in the province. Beer is handled by the Saskatchewan Brewers Agents. Beverages covered are soft drinks and beer.

Saskatchewan differs from its western neighbours in one particular aspect. Saskatchewan has chosen to ban non-refillable containers for beer and soft drinks. The only containers that are allowed to be sold in the province for beer and soft drinks are refillable containers. Although a move ostensibly taken on environmental grounds, it also has had the effect of protecting the Saskatchewan soft drink industry. The move does not apply to products such as fruit and vegetable juices or to bottled waters.

The only exception is for the far northeastern portion of the province. Non-refillables may be sold in that area.

The Saskatchewan Government is under pressure to allow for the sale of non-refillables. Some of this pressure comes from the soft drink industry, which wants to market 2 litre plastic containers. In addition, some comes from the brewers, who are becoming increasingly centralized and find cans much easier to transport; some comes from the public in general.

### 2.4.4 Manitoba

Manitoba has no specific legislation which sets up their return system. There are anti-littering provisions under their Litter Act, but no particular provisions requiring returns.

Manitoba initially chose to enter into an agreement with their bottlers. The agreement was to allow for the sale of non-refillables. The bottlers agreed to a percentage-of-sales basis for refillables and non-refillables. Although still in place, the percentages once agreed to are no longer adhered to. Effectively, the agreement no longer exists. The Manitoba Soft Drink Association has set up a company which operates buy-back units. These units are portable and are located on shopping centre parking lots on a scheduled basis. These units buy

back aluminum cans from the consumer. There are plans in the works to commence buying back 2 litre plastic containers sometime in 1987.

One unit is currently in service in Winnipeg, another is being developed for rural Manitoba. Some residents of the Northwest Territories, notably those in Rankin Inlet, have been discussing with Manitoba Soft Drink Recycling the possibility of taking some cans from their community (personal communication; Environment and Workplace Safety and Health, Winnipeg, Manitoba).

At the time of writing, the unit had been in operation for about five months. It had recovered approximately six tonnes of material. This represents less than a 5% return rate.

Refillables are returnable to retailers. This is not a system demanded by legislation, but one which the manufacturers maintain on their own.

### 2.4.5 Ontario

Ontario is the one province which has gone the farthest away from traditional beverage container programs.

Refillables in Ontario are returned to retailers. Beer bottles are returned to beer stores. Both of these container types do carry deposits.

However, the Province has taken a substantially different approach in the area of non-refillables.

Rather than place deposits on non-refillable containers, the Province has elected to treat non-refillables as any other recyclable commodity.

The beverage manufacturer, container manufacturers and material manufacturers have agreed to set up a pool of money (called the Recycling Advisory Committee) to be used in capital funding for resource recovery projects. The current projects of choice are curbside collection programs.

The thinking behind this approach is that beverage containers, and most particularly aluminum, have sufficient economic value to help drive and finance other collection programs. As such, beverage container legislation can then have much more of a substantial impact upon solid waste than would traditional beverage container return programs.

If the goals of the manufacturer are not met, then the Province still has the ability to proceed with alternative methods. Under the current program developed, the 2 PET L bottles, if they cannot be recovered at curbside, will have to carry an 80¢ deposit. This compares with a 30¢ deposit for this container in both British Columbia and Alberta.

# SECTION 3.0
# THE RECYCLED BEVERAGE CONTAINER INDUSTRY

## 3.0 THE RECYCLED BEVERAGE CONTAINER INDUSTRY

### 3.1 GENERAL

Wherever there is recycling, an industry has developed to support the programs in place. In this study, specifically, the recycled beverage container industry in Alberta will be focussed on for the following reasons:

- 85% of all beverage containers sold in the Northwest Territories originate in Alberta
- Truck Transportation routes from the most densely populated areas of the NWT lead into Alberta
- Alberta markets are closest to the major population centres in the NWT
- Alberta has one of the most extensive recycling programs in North America

The remaining communities not supplied from Alberta receive their beverages from Montreal, Quebec (11%), and Churchill, Manitoba (4%). It would go beyond the scope of this study to also elaborate on the recycling industries of Quebec and Manitoba in detail. However, it is known that these provinces have programs in place and it has been assumed that the respective markets would be available to a NWT recycling initiative, should it be implemented.

### 3.2 MARKETS IN ALBERTA

#### 3.2.1 Bottle Recycling for Refilling

As described in Section 2, refillable soft drink and beer bottles have been common for several decades.

Lately, however, there has been a shift. The soft drink industry has made a substantial move to non-refillable containers. Today, over 80% of the soft drinks sold in Alberta no longer come in refillable bottles. The economics of large

scale beverage canning and the advent of the 1, 2 and 3 L plastic container (PET = Polyethylene terephthalate), coupled with the reduced handling and shipping expenses, are largely responsible for this trend.

In the beer industry, canned beer has reached a market share of approximately 40% and seems to have stabilized. The universal beer bottle, the well established Alberta Brewer's Agents network of distribution and collection centres, a high deposit of $0.10 per bottle, and a certain customer preference for bottled beer has kept the refillable beer bottle alive. The system utilizing refillable bottles works well, and there are no indications that this system will be changed in the near future.

### 3.2.2 Glass Recycling

All non-refillable beverage containers collected by Alberta's depots are sold on behalf of the beverage manufacturers by specially appointed agents, to the actual recycling industries.

Glass is sold mainly to Domglas, Medicine Hat/Redcliff and Can-A-Sphere, Calgary.

Domglas is Alberta's largest producer of glass and recycles about 85% of Alberta's collected glass. They use up to 20% cullet in the production of new glass. Presently, they have the capacity to absorb an additional 40,000 tonnes per annum of cullet.

Cullet comes from collection centres in Edmonton and Calgary, where it is colour sorted and broken. Domglas then crushes it, cleans and processes it for use as raw material in the production of new products.

In January 1987, Domglas paid approximately $65 per metric ton of presorted clear glass, FOB, gate. Unsorted glass was not accepted.

Can-A-Sphere is a smaller recycler of clear glass only, which it uses to make centreline highway reflecters. Price per metric ton in January 1987 was approximately $44 FOB, the company's gate in Calgary.

### 3.2.3 Aluminum Recycling

Aluminum used beverage cans (UBCs) are a marketable commodity. In Alberta, the manufacturer's agent sells the UBCs (usually flattened or crushed) to a recycler, who densifies them into bales and sells them to the aluminum industry as a raw material for reprocessing.

The major recycler of UBCs in Alberta is Schred-A-Can Recyclers Ltd. Their head office is in Calgary, and UBCs are accepted in both Edmonton and Calgary. The compacted aluminum is sold in the United States and prices depend on market conditions. In the past year, prices have ranged from US $0.32-$0.42/lb. Schred-A-Can takes a commission to cover the cost of processing and handling and in January 1987 paid Can. $0.81-$0.97/kg (FOB, Edmonton or Calgary), depending on whether cans were delivered loose, or in finished baled or briquette form.

Another major recycler of aluminum cans has been identified in Vancouver, British Columbia. Pacific Metals Ltd. has quoted up to Can. $1.10/kg FOB, Vancouver, however, the transportation distances and costs must be taken into account.

Both recyclers expressed an interest in the aluminum available from the NWT and would welcome the opportunity to cooperate with the NWT government in establishing recycling procedures for all-aluminum cans.

### 3.2.4 Plastics Recycling

Only recently have plastics made a significant contribution as beverage containers. The development of PET plastics and their use mainly as 1, 2 and 3 litre soft drink containers has been highly successful, due mainly to their extremely lightweight and inexpensive manufacture.

From a recycling point of view, however, they have caused some concern. The market was suddenly flooded with used, non-refillable PET bottles and no established recycling procedures existed. In contrast to aluminum, the material cannot be remade into new containers.

Only one recycler of PET has been identified in Canada, namely, "Applied Polymer Research" in Edmonton. This firm claims that it can recycle PET into chips for injection molding and extrude it into flats and profile shapes. Prices paid in January 1987 were:

- $100 - $150 per tonne FOB Edmonton (colour presorted and caps removed)

or

- $80 - $100 per tonne FOB Edmonton (not sorted)

Applied Polymer Research states that it presently recycles over two million kilogram of PET a year and would like to increase this to nine million kilograms. However, some controversy exists within the recyling industry about the effectiveness of the process. More research into this subject is required before considering any PET recycling measures.

## SECTION 4

## MARKETS FOR THE NORTHWEST TERRITORIES

## 4.0 MARKETS FOR THE NORTHWEST TERRITORIES

### 4.1 GENERAL

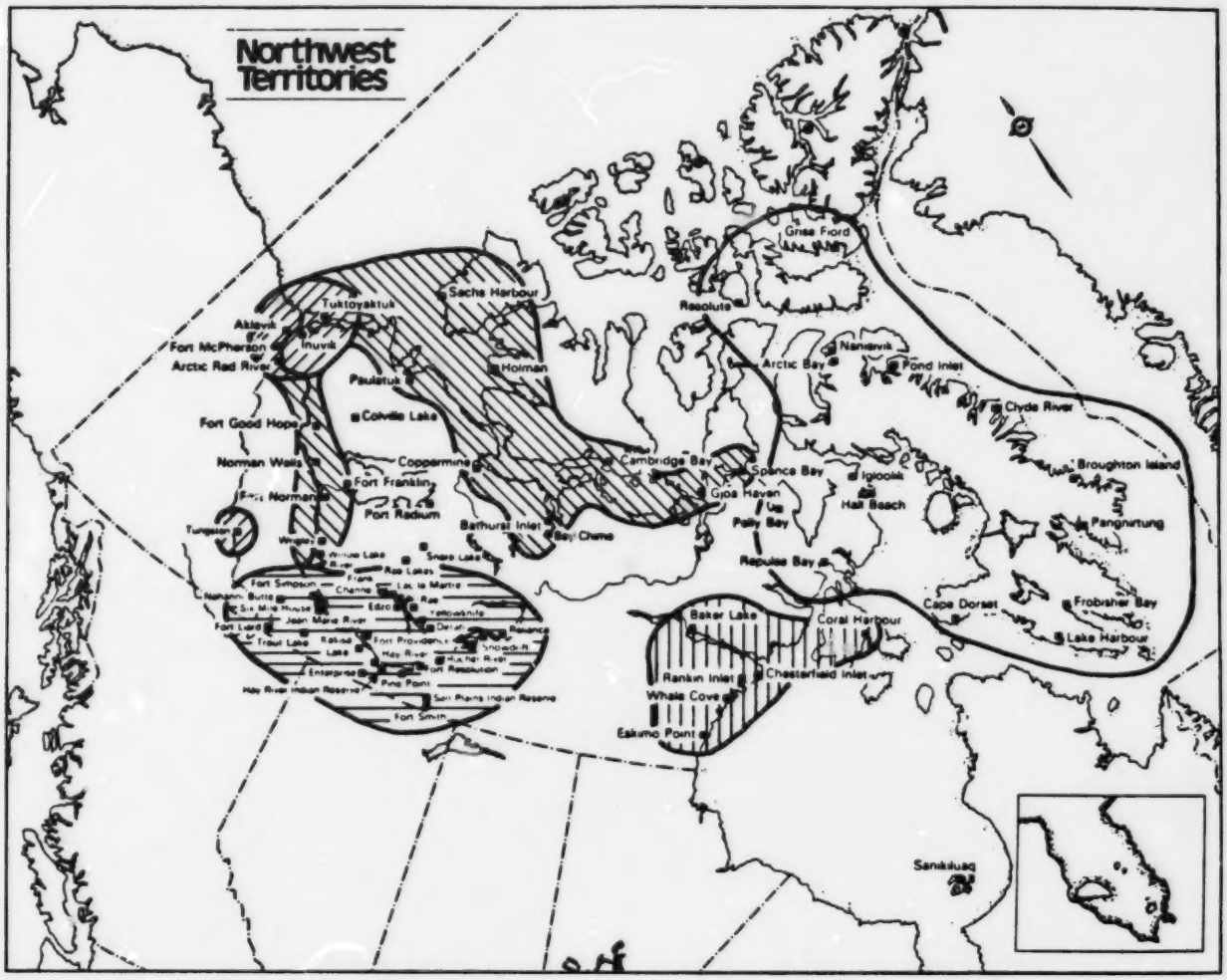
As stated in Section 3.1, 85% of all beverage containers entering the Northwest Territories originate in Alberta. For the same reasons stated, most markets for recyclable materials from the NWT are available in Alberta. For this reason, only the Alberta markets are considered in this study. However, all beverage containers sold in the NWT are considered in the overall picture and included in the statistics.

### 4.2 TRANSPORT SYSTEMS AND REGIONS IN THE NORTHWEST TERRITORIES

For purposes of this study, five major transportation regions have been identified and are depicted in Figure 4-1.

Tables 4-1 to 4-5 list the communities serviced in each of these regions, with their respective populations.

The 1987 population estimates are based on the 1985 estimates taken from the Northwest Territories Data Book 1986-87 and escalated by 3% per year.




| SERVICE AREA | POPULATION (1987 est.) | FREIGHT SERVICE BY: |
|---|---|---|
| 1. SOUTHWEST | 23 700 | TRUCK VIA MACKENZIE HIGHWAY<br>CNR TO HAY RIVER |
| 2. NORTHWEST | 6 400 | TRUCK VIA DEMPSTER HIGHWAY<br>BARGE FROM HAY RIVER |
| 3. WEST CENTRAL | 6 800 | BARGE FROM HAY RIVER |
| 4. KEEWATIN | 4 700 | BARGE FROM CHURCHILL, MAN. |
| 5. EASTERN | 10 300 | SHIP, FROM MONTERAL, P.Q.<br>(EASTERN ARCTIC SEALIFT) |

Figure 4.1

SERVICE AREAS / TRANSPORTATION REGIONS

## TABLE 4-1
## SOUTHWESTERN AREA
## SERVICED BY THE MACKENZIE HIGHWAY

| Community | Population (1985 estimate) |
|---|---|
| Hay River | 3,190 |
| Pine Point | 1,759 |
| Fort Smith | 2,468 |
| Kakisa | 36 |
| Fort Simpson | 1,102 |
| Fort Providence | 663 |
| Fort Liard | 397 |
| Rae/Edzo | 1,481 |
| Detah | 143 |
| Yellowknife | 11,077 |
| TOTAL | 22,316 |
| **Total (1987 Estimate)** | **23,700** |

## TABLE 4-2
## NORTHWESTERN AREA
## SERVICED BY DEMPSTER HIGHWAY

| Community | Population (1985 estimate) |
|---|---|
| Arctic Red River | 123 |
| Fort McPherson | 693 |
| Inuvik | 3,166 |
| Aklavik | 758 |
| Tuktoyaktuk | 882 |
| Tungsten | 409 |
| TOTAL | 6,031 |
| **Total (1987 Estimate)** | **6,400** |

## TABLE 4-3

## COMMUNITIES SERVICED BY BARGE FROM HAY RIVER, WEST-CENTRAL REGION

| Community | Population (1985 estimate) |
|---|---|
| Snowdrift | 270 |
| Reliance | -- |
| Wrigley | 156 |
| Fort Norman | 299 |
| Fort Franklin | 589 |
| Norman Wells | 749 |
| Fort Good Hope | 693 |
| Cambridge Bay | 902 |
| Coppermine | 887 |
| Gjoa Haven | 663 |
| Holman | 345 |
| Paulatuk | 200 |
| Sachs Harbour | 161 |
| Spence Bay | 452 |
| TOTAL | 6,366 |
| **Total (1987 Estimate)** | **6,800** |

## TABLE 4-4
## COMMUNITIES SERVICED BY BARGE (NTCL)
## FROM CHURCHILL, MANITOBA

| Community | Population (1985 estimate) |
|---|---|
| Baker Lake | 1,003 |
| Chesterfield Inlet | 255 |
| Coral Harbour | 455 |
| Eskimo Point | 1,166 |
| Rankin Inlet | 1,315 |
| Whale Cove | 199 |
| TOTAL | 4,393 |
| **Total (1987 Estimate)** | **4,700** |

## TABLE 4-5
## COMMUNITIES SERVICED BY EASTERN ARCTIC SEALIFT

| Community | Population (1985 estimate) |
|---|---|
| Arctic Bay | 432 |
| Broughton Island | 410 |
| Cape Dorset | 837 |
| Clyde River | 510 |
| Frobisher Bay | 2,954 |
| Grise Fiord | 131 |
| Hall Beach | 415 |
| Igloolik | 788 |
| Lake Harbour | 285 |
| Nanisivik | 288 |
| Pangnirtung | 893 |
| Pond Inlet | 808 |
| Repulse Bay | 402 |
| Resolute | 169 |
| Sanikiluag | 426 |
| TOTAL | 9,748 |
| **Total (1987 Estimate)** | 10,300 |

## 4.3 POTENTIAL OF RECOVERABLE MATERIAL

In an attempt to quantify the total number of beverage containers entering the NWT, extensive telephone surveys were held with all suppliers and distributors of soft drinks, the Northwest Territory Liquor Control Board and a number or retail outlets. The results are compiled in Table 4-6.

## TABLE 4-6
## TYPES AND QUANTITIES OF BEVERAGE CONTAINERS ENTERING THE NORTHWEST TERRITORIES

| Beverage Type | Container | Quantity per Annum(1) | Annual Quantity per Person(2) |
|---|---|---|---|
| Soft Drink | 300 ml glass | 41,000 | 0.8 |
| | 355 ml aluminum can | 7,800,000 | 153 |
| | 1,2,3 litre PET bottle | 212,000 | 4.2 |
| Fruit Juices | 48 oz. steel can | N/A(3) | |
| | 250 ml and 1 litre cardboard tetrapak | N/A(4) | |
| Beer | 341 ml bottle | 8,902,704 | 175 |
| | 350 ml aluminum can | 2,903,472 | 57 |
| Wine and Spirits | 341 ml - 1141 ml glass bottles | 991,589 | 19.4 |

**Notes:**

1. Based on 1985 and 1986 estimates by suppliers of soft drinks and the NWT Liquor Commission.
2. Based on 1985 population estimates (approximately 51,000 total population).
3. 48-ounce steel cans are being phased out and are being replaced by carboard tetrapak containers (see Note 4.).
4. Cardboard tetrapak containers are non-recyclable.

The figures received from the Liquor Control Board are from 1986 records and are assumed to be accurate. Soft drink sales figures are usually confidential and it is, therefore, only possible to obtain estimates. The figures received, however, appear to be in line when measured against beer consumption and are considered sufficiently accurate for this study (generally, soft drinks and beer are expected to be sold in about equal amounts; in this case, beer consumption is slightly higher).

## 4.4 ANTICIPATED RECOVERY RATES

The achievable recovery rate of beverage containers for recycling depends heavily on the type of system and collection strategy chosen (see Section 2).

Assuming the best case, namely, some form of mandatory recycling, coupled with high deposits and a high profile public awareness program, then the achievable return rates could be as high as 75%.

In the worst case, if nothing is done, free market forces will determine the extent of recycling. As can be observed, recycling is limited to where it is economically viable.

The best case mentioned above is costly in terms of monetary funds that must be paid for an extensive recycling program. The worst case is costly in terms of environmental damage and lost resources. An optimum solution will be found somewhere between these two extremes.

## 4.5 TRANSPORTATION TO MARKETS

One of the greatest obstacles facing the recovery of beverage containers in the NWT is the vastness of the country and the remoteness of the communities. In many cases, road connections do not exist, and shipping is only possible during the summer by barge or by air. Where roads are available, long distances raise the cost of hauling goods.

Table 4-7 lists the carriers that service the various regions and their respective freight/backhaul rates. Virtually all communities are accessible by air, but for the purpose of this study, air freight was deemed too costly to be considered for the recycling of beverage containers.

## TABLE 4-7
## FREIGHT RATES FROM THE NORTHWEST TERRITORIES
## (Backhaul)

**Southwest Region**

| | |
|---|---|
| Carrier: | Truck |
| Load Size: | 20,000 lbs. or 8 ft. x 8 ft. x 26 ft. volume |
| Rate: | From Yellowknife to Edmonton, approximately $500/load |
| | From Hay River to Edmonton, approximately $400/load |
| | From Edmonton to Calgary, add approximately $200/load |
| Conditions: | Occasional backhaul |
| | Rates can be negotiated |

| | |
|---|---|
| Carrier: | Rail, CN |
| Load Size: | 30,000 lbs. minimum |
| Rate: | From Hay River to Edmonton, $1,896 for minimum load |
| Conditions: | Loading and unloading are extra |

**Northwest Region**

| | |
|---|---|
| Carrier: | Truck |
| Load Size: | 20,000 lbs. or 8 ft. x 8 ft. x 26 ft. volume |
| Rate: | From Inuvik to Edmonton, approximately $1500/load |
| Conditions: | Rates can be negotiated |

| | |
|---|---|
| Carrier: | Barge |
| Rate: | From Inuvik to Hay River, $9.74/100 lbs. |

(continued on following page)

Table 4-7 (continued)

**West Central Region**

| | |
|---|---|
| Carrier: | Barge |
| Rate: | From Arctic Communities to Hay River, approximately $20/100 lbs. |
| | From Mackenzie Communities to Hay River, approximately $6.85/100 lbs. |
| Conditions: | Most arctic communities accessible only once a year.<br>All communities serviced only in summer. |

**Hudson Bay Region**

| | |
|---|---|
| Carrier: | Barge |
| Rate: | From all communities to Churchill, Man., $19.60/100 lbs. |

**Eastern Region**

| | |
|---|---|
| Carrier: | Boat (Eastern Arctic Sealift) |
| Rate: | From Fox Basin to Montreal, Que., $378/1000 kg or 2.5 $m^3$ |
| | From South Baffin to Montreal, $246/1000 kg or 2.5 $m^3$ |
| | From East Baffin to Montreal, $399/1000 kg or 2.5 $m^3$ |
| | From mid- and high-Arctic to Montreal, $396/1000 kg or 2.5 $m^3$ |
| Notes: | These are 1986 rates and are indirectly subsidized. |

## 4.6 PRESENT RECYCLING OPERATIONS IN THE NORTHWEST TERRITORIES

The only beverage container shipped into the NWT from Alberta with a deposit affixed is the beer bottle. The price of each bottle includes a 10¢ deposit, which is refundable by Alberta Brewers Agents.

Two private operations have been identified that collect beer bottles in the NWT and return them to Alberta. One is located in Yellowknife, the other in Inuvik. Both pay a percentage of the deposit (63% in Yellowknife, 42% in Inuvik) to the person returning the bottles, and use the difference to pay for the expenses involved in returning the bottles. Both are involved in trucking and recycle bottles only as a sideline, since there is no profit to be made. However, since most trucks return to Alberta empty, carrying bottles for refund helps offset the costs of a no-load trip.

Both recyclers expressed an interest in recycling aluminum cans, provided a program was in place to make it financially attractive.

In addition to these two recyclers, it has been learned that many private individuals who occasionally drive to Alberta store their beer bottles until they make the trip and then take them along to obtain the deposit.

It has also been reported by a soft drink distributor in Hay River that up to 25% of the cans sold near the Alberta border find their way back into Alberta for deposit collection.

# SECTION 5
# STRATEGIES FOR BEVERAGE CONTAINER RECYCLING IN THE NORTHWEST TERRITORIES

# 5.0 STRATEGIES FOR BEVERAGE CONTAINER RECYCLING IN THE NORTHWEST TERRITORIES

## 5.1 GENERAL

Based on transportation routes and geographic regions, three strategies have been identified:

1. Recycling in the Southwest. This is the most densely populated region and has the closest road link to Alberta. It includes all communities accessible from the Mackenzie highway, as well as those serviced by barge from Hay River excluding, however, the area around Inuvik that is connected to the Dempster Highway. This strategy reflects service areas 1 and 3 from Figure 4-1.

2. Recycling in the Northwest. This is the area centred around Inuvik and serviced by the Dempster Highway. It also includes communities, such as Tuktoyaktuk, which are connected by winter roads. See service area 2 in Figure 4-1.

3. The final strategy encompasses areas 4 and 5 from Figure 4-1, namely, those serviced from Churchill, Manitoba, and Montreal, Quebec.

Table 5-1 gives a breakdown of the recyclable containers by region, weight, carrier and place of origin.

This section will identify recycling potential and possibilities only. Interpretations and recommendations will be made in Section 6.

## TABLE 5-1

## CONTAINERS ENTERING THE NORTHWEST TERRITORIES

| Region | Container Type | Number per year (1987 est.) | Weight[1] per year (tonnes) | Carrier | Origin |
|---|---|---|---|---|---|
| Southwest | 300 ml glass | 41,000 | 7 | truck | Alberta |
| | 355 ml aluminum can | 3,626,100 | 65 | | |
| | 2 l PET bottles[2] | 99,540 | 6 | | |
| | 341 ml beer bottle/glass | 5,323,000 | 1,210 | | |
| | 350 ml aluminum beer can | 1,736,000 | 31 | | |
| | wine/liquor bottle/glass[3] | 922,200 | 506 | | |
| | **Totals** | **11,747,840** | **1,825** | | |
| Northwest | 355 ml aluminum can | 979,200 | 17 | truck/ | Alberta |
| | 2 l PET bottles | 26,880 | 2 | barge | (via B.C.) |
| | 341 ml beer bottle/glass | 1,438,500 | 327 | | |
| | 350 ml aluminum beer can | 469,100 | 8 | | |
| | wine/liquor bottle/glass | 160,200 | 88 | | |
| | **Totals** | **3,073,880** | **442** | | |
| West-Central | 355 ml aluminum can | 1,040,400 | 19 | barge | Alberta |
| | 2 l PET bottles | 28,560 | 2 | | |
| | 341 ml beer bottle/glass | 1,518,400 | 345 | | |
| | 350 ml aluminum beer can | 495,200 | 9 | | |
| | wine/liquor bottle/glass | 169,100 | 93 | | |
| | **Totals** | **3,251,660** | **468** | | |
| Keewatin | 355 ml aluminum can | 719,100 | 13 | barge | Manitoba |
| | 2 l PET bottles | 19,740 | 1 | | |
| | 341 ml beer bottle/glass | 178,000 | 40 | | |
| | 350 ml aluminum beer can | 58,000 | 1 | | |
| | wine/liquor bottle/glass | 20,000 | 11 | | |
| | **Totals** | **994,840** | **66** | | |
| Eastern | 355 ml aluminum can | 1,575,900 | 28 | boat | Montreal |
| | 2 l PET bottles | 43,260 | 3 | | |
| | 341 ml beer bottle/glass | 445,100 | 101 | | |
| | 350 ml aluminum beer can | 145,200 | 3 | | |
| | wine/liquor bottle/glass | 49,600 | 27 | | |
| | **Totals** | **2,259,060** | **162** | | |
| | **GRAND TOTAL** | **21,327,280** | **2,963** | | |

**Notes:**

1. Weights are calculated empty container weights.

| | | |
|---|---|---|
| 300 ml glass: | 4.7 lbs/dozen | or 178.0 kg/1000 |
| aluminum can | 25½ cans/lb | or 17.8 kg/1000 |
| 2l PET bottle | 1.7 lbs/dozen | or 64.4 kg/1000 |
| 341 ml beer bottle | 6 lbs/dozen | or 227.3 kg/1000 |
| wine/liquor bottle | ave. 14-15 lbs/doz | or 549 kg/1000 |

2. PET bottles are supplied in 1, 2 and 3 litre sizes. 2 litre has been used as an average.

3. Wine and liquor bottles range in size from 341 ml to 1141 ml. 750 ml has been used as an average size.

Quantities are based on per capita consumption for soft drinks (assuming approximate equal consumption throughout the NWT).

Alcoholic beverage container quantities are distributed in accordance with the breakdown by region supplied by the NWT Liquor Commission.

## 5.2 THE SOUTHWEST REGION

The Southwest Region has the highest concentration of beverage containers in the NWT, especially when the areas serviced by barge from Hay River are included. It also provides an infrastructure that is conducive to the shipment of goods, such as an extended highway system. This gives the Southwest Region good potential for a successful beverage container recycling program.

### 5.2.1 Recycling Potential

Two groups of recyclable containers must first be identified: refillables and non-refillables.

The only refillable container of significance is the 341 ml glass beer bottle. In this region alone, approximately 6.8 million bottles of beer are consumed annually. This figure is substantial and, since bottled beer already carries a 10¢ deposit from Alberta, a good potential exists to organize a return system and recycle the majority of these bottles. About 20% to 30% are presently being returned to Alberta from this region through private initiative.

A substantial number of non-refillable containers are distributed, totalling over 730 metric tonnes per year (see Table 5-1). If only 65% were returned, it would represent 81 tonnes of aluminum, 5 tonnes of PET and 390 tonnes of glass per year, which is an impressive volume that should interest some of the recylcers. No known collection or recycling of these materials takes place at the present time.

### 5.2.2 Collection Methods

Collection methods will depend on the type of recycling system chosen (see Section 2). If container depots are chosen, there is potential for two depots: one in Yellowknife to cover that main population centre, and one in Hay River. The Hay River depot, located in the transportation hub of the area, would collect containers from all other communities. In addition, most barges return to Hay River and could bring containers from the areas serviced by them.

All communities without central depots would require some form of collection system. Because of the low volumes involved, this could be in the form of a part-time business, possibly attached to a general store, service station or other local business. In another option, businesses selling beverages could be required to take back all containers sold. Periodically, when containers are filled and/or when inexpensive transportation (backhaul) is available, these containers would be shipped to one of the main depots for processing.

### 5.2.3 Processing

The only processing required for refillable beer bottles is crating for ease of handling/loading/unloading.

Non-refillable containers pose a different problem. Aluminum and PET are extremely light for the volume they fill and must be condensed before they can be economically transported.

Smaller collection centres would be required to undertake some form of pre-processing. With aluminum cans and PET containers, this would involve flattening or crushing them (approximately 3:1 ratio). This can be achieved by inexpensive crushers which are available for under $3,500. Glass would have to be colour-sorted and broken.

In the main collection depots, processing would continue. This is required to bring aluminum and PET into a state that is optimum for storing, handling and shipping and is acceptable to the recycler receiving the materials. Aluminum cans can be compressed further (10:1) and formed into briquettes (6" x 15" x 8") which weigh about 12 kg. Machines to do this are considerably more expensive than crushers and can cost up to $25,000. However, the costs would be offset by the savings in handling, storage, transportation and by the fact that recyclers pay more for finished briquettes than loose cans. PET could be baled by a similar, although reportedly much more expensive (up to $35,000), machine into

200 kg to 300 kg bales, about 60 cm x 60 cm x 100 cm in size. Glass is generally shipped colour-sorted and broken.

Once the non-refillable containers have been processed, they are ready for shipment to the recycling centres in Alberta and beyond, where a demand for additional materials has been identified.

### 5.2.4 Transportation to Markets

Transportation from Yellowknife and Hay River to the Alberta markets would be by truck. Backhaul rates are available from most major trucking companies (see Table 4-7) and are negotiable.

Although a rail line to Hay River exists, rates quoted by CN are more than twice the backhaul rates quoted by the trucking companies. The relatively small quantities involved and the convenience of direct pick up and delivery also favour trucking.

### 5.2.5 Cost Summary

In order to establish a price per container relationship, a hypothetical model was formed:

- All non-refillable beverage containers would be recycled.
- Deposit systems and return legislation would be in place.
- Refillable containers (beer bottles) would be handled separately by the Liquor Control Board in cooperation with Alberta Brewers Agents.
- Central depots would be located in Yellowknife and Hay River. The Hay River depot would handle all returned containers from the barges and carry the collection charges.
- Achieveable return rate is 65%.
- Vendors of beverages are obligated to take back empties and prepare them for the depots.

The estimated costs of operating depots at Yellowknife and Hay River are shown in Tables 5-2 and 5-3.

## TABLE 5-2
## ESTIMATED COST OF OPERATING
## A RECYCLING CENTRE AT YELLOWKNIFE
**(Region Serviced: Yellowknife, Rae/Edzo)**

**Monthly Expenses:**

| | | |
|---|---|---|
| Rent and Utilities | $1,200 | |
| Manpower Manager | 2,500 | |
| Helpers | 1,200 | |
| Other Overhead Expenses | 200 | |
| Equipment Depreciation (total investment $36,000; 5-year, straight line) | 600 | |
| Interest Expense | 300 | |
| Miscellaneous | 200 | |
| Transportation from Surrounding Communities | 500 | |
| **Total** | **$6,700** | per month |

**Volume of Aluminum, Plastic Containers and Non-Refillable Glass:**

Yellowknife handles 57% of containers in the Southwest area (based on population)

| | |
|---|---|
| Total Number of Containers for SW Region: | $6.38 \times 10^6$ |
| Portion Returnable to Yellowknife (57%) | $3.63 \times 10^6$ |
| Estimated Return Rate (65%): | |
| Containers Handled by Yellowknife Depot per annum | $2.36 \times 10^6$ |
| **Containers Handled by Yellowknife Depot per month** | **196,660** |

**Average Cost per 1000 Containers:** **$34.07**

## TABLE 5-3

## ESTIMATED COST OF OPERATING A RECYCLING CENTRE AT HAY RIVER

**(Region Serviced: Hay River, Fort Smith, Pine Point, Fort Providence, Fort Simpson, Snowdrift, Fort Norman, Fort Franklin, Norman Wells, Fort Good Hope and all communities serviced by the MacKenzie River Barge System)**

**Monthly Expenses:**

| | | |
|---|---|---|
| Rent and Utilities | $1,000 | |
| Manpower Manager | 2,500 | |
| Helpers | 1,200 | |
| Other Overhead Expenses | 200 | |
| Equipment Depreciation (total investment $36,000; 5-year, straight line) | 600 | |
| Interest Expense | 300 | |
| Miscellaneous | 200 | |
| Transportation from Surrounding Communities | 1,000 | |
| **Total** | **$7,000** | per month |

**Volume of Aluminum, Plastic Containers and Non-Refillable Glass:**

| | |
|---|---|
| From Road Accessed Area (43% of SW Region) | 2.75 x 106 |
| From Barge Accessed Area (100% of West-Central) | 1.73 x 106 |
| Total per annum | 4.48 x 106 |
| Estimated Return Rate (65%): | |
| Total Containers Handled per annum | 2.91 x 106 |
| **Total Containers Handled per month** | **242,800** |

**Additional freight charge for barging from West-Central Region:**

| | | |
|---|---|---|
| Monthly quanitity of cans (83,178) = approx. | 1,480 | kg |
| Monthly quantity of PET (1,547) = approx. | 100 | kg |
| Monthly quantity of glass (9,160) = approx. | 5,029 | kg |
| Assumed Average Freight Charge of $.30/kg x = $1,985 additional costs per month | 6,609 | kg |

**Average Cost per 1000 Containers** **$38.37**

Total costs are summarized in Tables 5-4 and 5-5.

It is interesting to note that the aluminum can is by far the least expensive to recycle, requiring a handling charge of about 2¢. With PET, the amount almost doubles and with glass it is about 2½ to 3 times as high as aluminum.

The sensitivity of the return rate is substantial. If, for example, in Yellowknife it falls to 50% from the assumed 65%, the average cost per 1000 containers for operating a depot goes up 30%, which adds 1¢ to the minimim required handling charge per container. A 35% return rate results in an 86% increase in cost, resulting in 2.1¢ being added to the unit handling charge.

It must be remembered that these numbers are based on the assumptions outlined at the beginning of this section and the actual values may differ. However, they do demonstrate the order-of-magnitude cost relationships between the various container materials.

The costs for returning refillable beer bottles to Alberta (transportation only) were supplied by the private recycler in Yellowknife and are estimated at about 4¢ per bottle, excluding profits.

## TABLE 5-4

## COST SUMMARY FOR YELLOWKNIFE RECYCLING DEPOT

| Container | Collection,[1] Handling & Storage Costs per 1000 containers ($) | From/to Alberta Recycling Centre per 1000 containers ($) | Recycle Value[3] of material per 1000 containers FOB Alta. ($) | Profit/[5] Loss per 1000 cont. ($) | Min.[6] required handling charges per cont. ($) |
|---|---|---|---|---|---|
| Aluminum Can 341 or 350 ml | 34.07 | 1.00[2] | 17.25 | -17.82 | 0.018 |
| PET Plastic Bottles 1, 2 or 3 l | 34.07 | 10.00[4] | 6.44 | -37.63 | 0.038 |
| Wine/Liquor glass bottles 341 ml to 1141 ml | 34.07 | 30.00 to Edmonton<br>12.00 - Edm. to Calgary | 19.77 FOB Calg. | -56.30 | 0.056 |

**Notes:**

1. Based on estimates from Table 5-2.
2. Based on use of a bisquetter or equivalent compacting machine to bale cans to achieve density for 20000# load backhauling.
3. Based on January 1987 prices.
4. Based on flattened and baled containers.
5. Provided all categories are recycled with a 65% return rate.
6. Not including any profits.

## TABLE 5-5

## COST SUMMARY FOR HAY RIVER RECYCLING DEPOT

| Container | Collection,[1] Handling & Storage Costs per 1000 containers ($) | From/to Alberta Recycling Centre per 1000 containers ($) | Recycle Value[3] of material per 1000 containers FOB Alta. ($) | Profit/[5] Loss per 1000 cont. ($) | Min.[6] required handling charges per cont. ($) |
|---|---|---|---|---|---|
| Aluminum Can 341 or 350 ml | 38.37 | 0.80[2] | 17.25 | -21.92 | 0.022 |
| PET Plastic Bottles 1, 2 or 3 l | 38.37 | 8.00[4] | 6.44 | -39.93 | 0.040 |
| Wine/Liquor glass bottles 341 ml to 1141 ml | 38.37 | 24.00 to Edmonton<br>12.00 - Edm. to Calgary | 19.77 | -54.60 | 0.055 |

**Notes:**

1. Based on estimates from Table 5-3.
2. Based on use of a bisquetter or equivalent compacting machine to bale cans to achieve density for 20000# load backhauling.
3. Based on January 1987 prices.
4. Based on flattened and baled containers.
5. Provided all categories are recycled with a 65% return rate.
6. Not including any profits.

## 5.3 THE NORTHWEST REGION

The Northwest Region consists of a small, fairly concentrated group of communities around Inuvik which are serviced by the Dempster Highway (see Table 4-2 and Figure 4-1). The Dempster Highway leads through the Yukon Territories and northern B.C. into Alberta. The distance is substantial, over 3300 km from Inuvik to Edmonton, but regular truck traffic exists, and favourable backhaul rates could make beverage container recycling viable for this region.

### 5.3.1 Recycling Potential

The population in this region is about one-fifth of the Southwest Region and, consequently, less material for recycling will be available. Nevertheless, if inexpensive collection and storage methods are developed, and acceptable backhaul rates established, there are still a total of 1.4 million beer bottles and 115 metric tonnes of non-refillable containers that are potentially recyclable. Inuvik is also the centre of northern oil exploration. If activity in the Beaufort area picks up, a substantial increase in beverage consumption can be expected.

### 5.3.2 Collection Methods

The same comments as for the Southwest Region (Section 5.2.2) apply. However, the reduced volume would only allow for one central depot. Even this depot, in order to be profitable, would have to be part-time and preferably connected with some other business.

### 5.3.3 Processing

Here, too, the same requirements as outlined in Section 5.2.3 apply. However, the volume of PET containers is fairly low and may not justify the cost of a baling machine. If recycling of PET is to be attempted, then an alternate method of flattening and baling PET containers would have to be researched.

### 5.3.4 Transportation to Markets

All recyclable materials could be trucked to Alberta. Although the distance is substantially longer than from Hay River, most trucks return to Edmonton empty and backhaul rates are negotiable.

As an alternative, backhaul barge rates could be negotiated to Hay River where the materials would be combined with those of the Southwest Region and hauled to Edmonton.

### 5.3.5 Cost Summary

The same model as detailed in Section 5.2.5 for the Southwest Region was applied to the Northwest Region. The differences are that there is only one depot, which is a part-time operation, and is located in Inuvik. The estimated costs of operating this depot are outlined in Table 5-6.

Costs are substantially higher than in Yellowknife and Hay River and this is due to lower volumes handled and higher transportation rates. However, the same relationships between aluminum, PET and glass are again evident. Aluminum is by far the least costly material to recycle.

The present recycler of beer bottles estimates that it costs about 6¢ per bottle to cover the costs of returning them to Edmonton. However, as with the other recyclers in Yellowknife, the operation is only a sideline and no accurate overhead costs were available.

## TABLE 5-6
## ESTIMATED COST OF OPERATING
## A RECYCLING CENTRE AT INUVIK
**(Region Serviced: Inuvik, Aklavik, Arctic Red River, Fort McPherson, Tuktoyaktuk)**

| | | |
|---|---|---|
| **Monthly Expenses** (part-time operation): | | |
| Rent and Utilities | $ 800 | |
| Manpower Manager | 1,600 | |
| Helpers | 800 | |
| Other Overhead Expenses | 200 | |
| Equipment Depreciation (total investment $36,000; 5-year, straight line) | 600 | |
| Interest Expense | 300 | |
| Miscellaneous | 200 | |
| Transportation from Surrounding Communities | 400 | |
| **Total** | **$4,900** | per month |
| **Volume of Aluminum, Plastic Containers and Non-Refillable Glass:** | | |
| Road Accessed NW Region (total per annum) | $1.64 \times 10^6$ | |
| Estimated Return Rate (65%): | | |
| Total Containers Handled per annum | $1.07 \times 10^6$ | |
| **Total Containers Handled per month** | **83,830** | |
| **Average Cost per 1000 Containers** | **$58.45** | |

## TABLE 5-7

## COST SUMMARY FOR INUVIK RECYCLING DEPOT

| Container | Collection,[1] Handling & Storage Costs per 1000 containers ($) | From/to Alberta Recycling Centre per 1000 containers ($) | Recycle Value[3] of material per 1000 containers FOB Alta. ($) | Profit/[5] Loss per 1000 cont. ($) | Min.[6] required handling charges per cont. ($) |
|---|---|---|---|---|---|
| Aluminum Can 341 or 350 ml | 58.45 | 3.00[2] | 17.25 | -44.20 | 0.044 |
| PET Plastic Bottles 1, 2 or 3 l | 58.45 | 30.00[4] | 6.44 | -83.01 | 0.082 |
| Wine/Liquor glass bottles 341 ml to 1141 ml | 58.45 | 90.00 to Edmonton<br>12.00 - Edm. to Calgary | 19.77 | -140.68 | 0.140 |

**Notes:**

1. Based on estimates from Table 5.6.
2. Based on use of a bisquetter or equivalent compacting machine to bale cans to achieve density for 20000# load backhauling.
3. Based on January 1987 prices.
4. Based on flattened and baled containers.
5. Provided all categories are recycled with a 65% return rate.
6. Not including any profits.

## 5.4 KEEWATIN AND EASTERN REGIONS

The Keewatin and Eastern Regions (see Figure 4-1) differ from the Western Regions by the fact that they have no road access and no clearly defined population concentrations. Only 15% of all beverage containers are distributed in 21 widely-scattered communities, with only Frobisher Bay having a population over 1500.

Recycling of the beverage containers from these regions would be somewhat complex, but not impossible. Very simple and inexpensive methods of container collection, compaction and storage could be developed and adapted to each community's unique characteristics. Agreements would then have to be reached with the transprotation companies (NTCL for Keewatin, and Eastern Arctic Sealift for the remainder) to return the collected containers to Churchill or Montreal, respectively, for acceptable rates at regular intervals. A way could then be found to integrate these containers with the recycling programs of Manitoba and Quebec.

# SECTION 6
# SUMMARY AND RECOMMENDATIONS

## 6.0 SUMMARY AND RECOMMENDATIONS

### 6.1 GENERAL

In a review of the preceeding sections, it became evident that the following criteria play a key role in developing beverage container recycling strategies:

- Container Preference
- Container Volumes and Concentrations
- Markets and their Accessibility

Container volumes and concentrations, as well as markets and accessibility, were sufficiently discussed in Section 5. In order to complete the picture, we will take a look at container preference.

### 6.2 CONTAINER PREFERENCE

The beverage container industry is in a state of flux. New materials and types of containers have changed, and are continuing to change, the composition of containers used. Selection criteria in a free economy are economics and consumer preference. Presently, large glass containers are being replaced by PET plastics, and single-serving glass containers are becoming victims of the aluminum can.

These changes do not happen without reason. Filled 2 litre PET beverage bottles weigh 24% less than comparable glass bottles; empty, they weigh 90% less; thus providing labour, energy and cost savings during shipping and transportation. Very similar weight savings are gained through the use of aluminum cans versus glass.

Considering the distances between communities in the Northwest Territories, the container of preference, with growing popularity, is the single-serving aluminum

can. The larger 1, 2 and 3 litre PET soft drink bottles are replacing glass, but are not as popular due to large size and associated high price tag.

Wine and spirits are still distributed in glass bottles, but in the U.S., the Federal Bureau of Alcohol, Tobacco and Firearms has sanctioned the use of PET as a packaging material for distilled spirits. This may lead to a gradual replacement of glass in this area as well. However, wines and spirits are considered premium products and manufacturers may be reluctant to package them in plastic until consumer acceptance is established.

A quantity comparison of beverage containers presently used in the Northwest Territories, is shown in Figure 6-1, which reflects the significant difference in quantity between aluminum can and glass beer bottles over other products.

## 6.3 SUMMARY

When reviewing the criteria for strategy selection, the following emerges.

The Southwest Region has a high preference for 350 ml and 355 ml aluminum cans and 341 ml glass beer bottles. Container concentration is highest of all regions. Markets for materials are most accessible.

The Northwest Region has the same container preference, but container quantity is less due to lower population. However, the concentration is sufficiently high for collection. Although markets are far away, road access and regular truck traffic make markets accessible.

The Eastern Region (including Keewatin) also prefers the aluminum cans and beer bottles, but there is no focal distribution/collection point so that concentration is very low. Transportation is available, but only by ship.

For the implementation of a recycling program for beverage containers, the regions, in the order of preference, are:

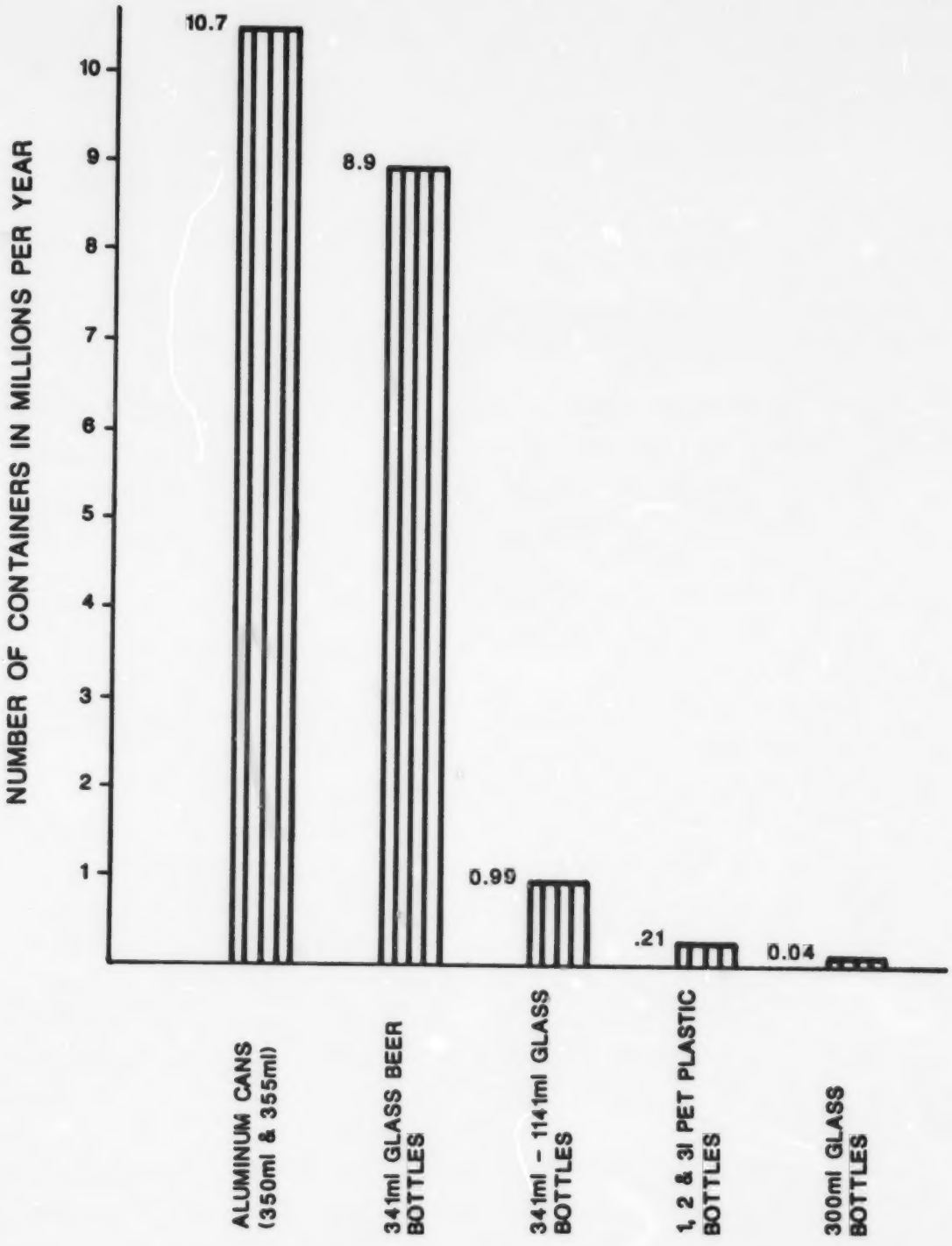



Figure 6.1

COMPARISON OF BEVERAGE CONTAINERS USED IN N.W.T.

1. Southwest
2. Northwest
3. East (with Keewatin)

The types of containers, in their order of preference for recycling, are:

1. Aluminum cans (350 ml and 355 ml)
2. Glass beer bottles (341 ml)
3. PET plastic bottles (1, 2 and 3 litre)
4. Glass wine and liquor bottles (341 ml to 1141 ml)

Note: Even though glass wine and liquor bottles are more numerous than PET bottles, PET has a higher preference for recycling because:

- PET is a greater litter nuisance than glass.
- PET is replacing glass more and more.
- PET is a greater hazard to the environment than glass.
- PET is more cost-efficient to recycle (see Tables 5-4, 5-5 and 5-7).

## 6.4 RECOMMENDATION

It is recommended, as a first phase, to implement a limited beverage container recycling program to immediately reduce the disposed quantities of the two most numerous containers: aluminum cans and beer bottles.

The program should foresee the refilling of beer bottles, either in Alberta or within the Northwest Territories, if a local brewery is desired. Aluminum cans should be compacted and shipped to recycling markets in southern Canada or the U.S.

The program, in its first phase, should be implemented in the area serviced by Alberta and accessible by truck or barge from Hay River. It should also be limited to the recycling of aluminum cans and refillable glass beer bottles.

Expanding the program to other regions and types of containers should be deferred until sufficient knowledge has been gained from the first phase of the program to ensure success of an expanded program.

## 6.5 ADVANTAGES AND DISADVANTAGES OF BEVERAGE CONTAINER RECYCLING

The advantages of a beverage container recycling program in the Northwest Territories are obvious:

- The load on the environment is substantially reduced.
- A new industry is formed; this will create jobs in all communities.
- Transportation companies will be able to operate more efficiently because of increased backhaul loads.
- Materials and energy are conserved.
- Recycling fosters a sense of community pride.

The disadvantage of an extensive beverage container recycling program is cost. Depending on legislation, it will either affect the consumers of beverages directly (if the price of recycling is included in the price of the beverage) or it will affect the whole region (if the costs are borne by the taxpayer). Costs depend on return rates and could rise substantially if the return rate is lower than predicted.

## 6.6 PROGRAM IMPLEMENTATION

In a first step, it must be decided whether to implement a deposit or non-deposit system as presented in Section 2.1. Assuming that a high recovery rate of beverage containers is desired, experience in other jurisdictions almost dictates the use of a deposit system.

Several possibilities exist for the flow of containers and deposits.

A deposit system would require a drop-off for containers in each community. In the larger centres (Yellowknife, Hay River and Inuvik) central depots would handle all containers from the surrounding area. Beverage containers collected in smaller communities would be shipped to the central depots on a regular basis. The conditions particular to the Northwest Territories do not allow for full-time depots in all communities, so that in smaller establishments, the collection task would have to be taken up by the local retail store, service station or other business on a part-time basis. It would be the responsibility of the collector to arrange for shipment of containers to the central depots. The shipping costs would be part of the central depot's collection expenses.

Deposits would be placed on the beverage container by the manufacturer and passed on to the retailer and finally the consumer. When the consumer returns the container to a collection centre, his deposit is refunded. The local collection centre is refunded by the depot which, in turn, is refunded by the manufacturer. When the used beverage containers are finally returned to the manufacturer, the manufacturer may, as in Alberta, appoint an agent to dispose of/recycle the containers for them. The flow of deposits will strongly support the flow of containers. It must be ensured, however, that double deposits do not occur, since most beverages cross provincial/territorial boundaries.

The costs for handling the containers (local collection centres and depots) must be addressed. A handling charge for containers must be established that sufficiently covers handling, storage, processing and transportation by the depots and collection centres. Similar to deposits, handling charges would be included in the price of the beverage by the manufacturer. When the containers are returned to him by the depot, the depot receives the handling fee for each container returned. In Alberta, these charges presently range from 2.75¢ to 4.5¢, depending on the type of container.

A variation on the above theme is a system (similar to California, see Section 2.1.2), where the depots act as recycling centres. They would collect the material, pay the deposit and market the material to end users themselves. A handling surcharge per container would be included in the price of the beverage

and would flow into a government fund. This fund would pay the recycler for any shortfalls if his costs are higher than the proceeds from material sales. This idea simplifies the whole system, but at the same time creates the need for close supervision and administration. This system does not provide incentives to sell recyclable materials and be profitable.

A third variation would be to allow the beer and soft drink manufacturers to establish their own container return system. The terms would have to be negotiated with the companies individually, provided they are prepared to implement such measures.

An option to be considered in conjunction with any of the above variations is to limit the type of container for soft drinks and beer to the aluminum can. This would greatly simplify collection and handling. In addition, the end product would be the most lucrative in any recycling scheme. Discussions should be held with manufacturers. They may well indicate an already strong trend in this direction.

Once a decision has been made, the costs determined in Section 5 must be verified and brought up to date. Backhaul rates should be negotiated with NTCL, ATL and the major trucking companies. This information will determine the actual handling charges that must be paid per container.

Legislation must be drafted and implemented. Existing legislation in other provinces could be called on for reference and modified to fit the particular needs of the Northwest Territories.

Once the program has been implemented, it must be closely monitored in order to determine where problems occur and how they can be overcome. A constantly-changing beverage container market requires a recycling system that has the flexibility to change with it in order to retain optimum profitability.

An extensive public awareness and education program must accompany any recycling operation. Especially the younger generation can be taught, from an early age, the value and necessity of recycling for their community.

## 6.7 OPTIONS

There are a number of future options dealing with implementing a total system in the Northwest Territories that could be exercised if initial program results look favourable.

1. Promote a local brewing industry. In many provinces, legislation exists that forces Canadian companies selling beer to also brew it in that province. The advantages of this type of legislation are clear. However, it must be ensured that there are sufficient markets for more than one brewery, otherwise competition would be severely restricted and this would be a disadvantage to the consumer.

2. Expand the recycling program to include PET containers. PET containers are a nuisance, since they are large, difficult to crush (material will bounce back into shape) and hard to dispose of. If the PET recycling operation in Alberta proves to be as viable as claimed, and a secure market for this material exists, then the advantages of recycling PET may outweigh the higher (than aluminum) costs of implementing such a program.

3. Recycling PET in the Northwest Territories. Again, if the recycling process proves viable, and the quantity of PET distributed in the Northwest Territories increases substantially, it may be feasible to reprocess PET in, say, Yellowknife, which would become part of a local plastics industry.

4. Find disposal methods for glass. Non-refillable glass containers are being replaced by PET. Nevertheless, substantial quantities are accumulated very year. Since it is too expensive to recycle glass to southern Alberta, and glass is already an inert material, landfilling may be an acceptable solution.

## 6.8 COMMENTS

A few concluding comments are included in this report to reflect the general impression gained from the many conversations with authorities, businesses and individuals in the Northwest Territories.

The Northwest Territories are inhabited by an independent people, dedicated to personal freedom and free enterprise. In discussions with businesses, there was a strong resistance to restrictive legislation. There was some opposition to deposit systems, mainly because of the extra time and paperwork involved. Retailers did not like the idea of taking back empty containers, mainly because of time and storage space restrictions. Businesses were generally open to incentives, provided they were used fairly (equitably) and only to overcome uneconomical situations due to distances and climate.

The danger to the environment of uncontrolled beverage container disposal was recognized by many and there appears to be a basic support for some form of recycling.

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Shred-A-Can Recyclers, Ltd., Calgary, Alberta. Mr. M. Cohen.

**Personal Communications:**

NWT Department of Statistics

NWT Liquor Control Board, Hay River

Peterson & Auger Ltd., Coca-Cola Distributors, Yellowknife

Territorial Beverages Ltd., Pepsi Cola Distributors, Hay River

Joe Gagnier, Coca-Cola Distributor, Hay River

Beaufort Wholesale & Distributing Ltd., Soft Drink Distributor, Inuvik

Environment and Workplace Safety and Health, Winnipeg

YK Super A Foods, Yellowknife

IGA, Yellowknife

The Bay, Edmonton, Alberta

Liquor Store, Yellowknife

Labatts Brewery, Edmonton

Pepsi Distributor, Edmonton

Contain-A-Way, Agents for Non-Refillable Beverage Containers, Calgary,

Applied Polymer Research, PET Recycler, Edmonton

Domglas, Medicine Hat, Alberta

Pacific Metals Ltd., Aluminum Recyclers, Vancouver, B.C.

Can-A-Sphere, Glass Recyclers, Calgary

Transport Canada, Eastern Arctic Sealift, Montreal, Quebec

Points North Transportation, Edmonton and Inuvik

Byers Transport Ltd., Edmonton and Yellowknife

Grimshaw Trucking Ltd., Edmonton

Canadian National Railways, Edmonton

NTCL, Edmonton

North Star Services and Construction, Beer Bottle Recycler, Inuvik

The Sportsman Ltd., Beer Bottle Recycler, Yellowknife